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Review of Fatal Injuries in the Petroleum Industry for 1980

Statistics Department

SEPTEMBER 1981

American
Petroleum
Institute

49TH ANNUAL REVIEW OF FATAL INJURIES AS REPORTED BY THE PETROLEUM INDUSTRY TO THE AMERICAN PETROLEUM INSTITUTE FOR 1980

On-Duty Fatalities

One hundred and two oil and gas companies and their subsidiaries, employing 445,000 workers, reported 66 on-duty fatal accidents during the year 1980. This is equivalent to one fatality for every 6,751 workers employed, compared with 8,597 in 1979.

Companies submitted detailed information on the causes of 49 of the fatal on-duty accidents. This information is reviewed herein. An increase occurred in the number of deaths where motor vehicles were involved, with 15 reported for 1980 compared with 8 in 1979.

Fatal on-duty accidents for 1980 are summarized, by functions and causes, and are compared with similar data for 1979 in Table I.

TABLE I

Fatalities by Functions and Causes, Years 1980 and 1979

	Cases Reported		Fire and Explosion		Struck by Equipment		Motor Vehicle		Aircraft		Other Causes	
	1980	1979	1980	1979	1980	1979	1980	1979	1980	1979	1980	1979
Total	49	32	14	9	2	4	15	8	4	1	14	10
Function:												
Exploration and Production	11	10	1	0	1	1	4	3	3	0	2	6
Gas Processing	2	1	0	0	0	1	0	0	0	0	2	0
Drilling	3	0	0	0	1	0	0	0	0	0	2	0
Chemicals	11	3	7	2	0	1	1	0	0	0	3	0
Refining	7	10	4	6	0	1	1	0	0	0	2	3
Marketing												
Wholesale	5	3	1	0	0	0	3	3	1	0	0	0
Retail	5	2	0	1	0	0	4	0	0	0	1	1
Pipeline												
Crude & Products	0	1	0	0	0	0	0	0	0	1	0	0
Gas	3	1	1	0	0	0	2	1	0	0	0	0
Marine	1	0	0	0	0	0	0	0	0	0	1	0
Research and Development	0	0	0	0	0	0	0	0	0	0	0	0
Engineering and General Services	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	1	1	0	0	0	0	0	1	0	0	1	0

EXPLORATION AND PRODUCTION

Struck by Truck

Employee was leading convoy of vehicles to work area. An eighteen-wheeler coming down the mountain lost its brakes. The driver jumped out of the truck and let it run free. The eighteen-wheeler crashed into the employee's pickup as he came out of a curve. The employee was killed instantly.

Experienced driver should have driven the eighteen-wheeler. The driver should have remained with the runaway truck and turned it off the road before jumping out.

Helicopter Crash

Helicopter was returning employees from off-shore drilling platform when it crashed, killing three employees.

All persons in the accident were killed and no cause has been determined.

Traffic Accident

Employee was driving behind two other vehicles at the time of the accident on a narrow caliche road (approximately 20 feet wide). The dust developed by these vehicles had created virtually zero driving visibility. The driver most likely could not determine his exact location on the road at the time of the accident and did not realize he was left of the center.

The cause of the accident was poor visibility and it could have probably been prevented if employee had waited until visibility had improved.

Explosion and Fire

Employee received fatal injuries as a result of explosion and fire on off-shore drilling rig.

Cause is under investigation.

Helicopter Crash

Employee was seated inside of helicopter when it fell from helicopter deck. Helicopter was attempting to take off from helicopter deck when it lost power and fell. Helicopter subsequently caught fire.

Accident is still under investigation.

Motor Vehicle Accident

Employee was involved in a motor vehicle accident which occurred around 5 a.m. He apparently did not see an eighteen-wheeler parked partially in the roadway and ran into the rear of that vehicle. Employee died as a result of the injuries received in this accident.

Motor Vehicle Accident

While driving alone in a company pickup truck, employee veered off the road and plunged down a deep canyon (approximately six hundred feet).

Exact cause is unknown.

Multiple Injuries

Employee was fatally injured while assisting in the repair of a cooling tower fan. He re-entered the cooling water tower fan area without his fellow employees' knowledge, at the same time the fan was started for a test run. He died from multiple injuries inflicted by the fan.

Lack of communication with all employees doing repair work is the primary cause of the accident. The cooling water fan area should have been inspected for clearance prior to energizing the fan starting switch.

GAS PROCESSING

Asphyxiation

Employee was working alone, while checking field operations, and was overcome by gas at a water flood injection station. He apparently detected a water leak at the station and was attempting to close some valves when he was overcome. He was found dead in the station by another employee.

Apparently the employee was not aware of the presence of the gas in the station where produced water from "sour" reservoirs is handled.

In addition to extra training and instructions, warning signs are posted. Gas monitor alarm systems and self-contained breathing appliances are being considered in order to prevent a recurrence of such accidents.

DRILLING

Fatal Fall

Employee was climbing the derrick to go to the crown area.

Employee did not use derrick-assist line to climb the derrick. The proper procedure would have been for one of the two men in the crown to come down with the belt and

then the deceased would have put the belt on before he climbed the derrick.

Drowning

Employee was last seen by co-workers six days before his body was discovered in Gulf waters. No one knew he fell overboard.

Struck by Equipment

Employee was scraping parafin on Unit and had just been let off on cribbing.

Since there were no witnesses, it was assumed that an extra long reel handle had struck the employee and he fell into the water.

Preventive measures include replacement of handle with proper size and enforcement of the rule which requires the wearing of life vests while working over water.

Head Injury

Employee was on a railroad car attaching slings to pipe that were to be unloaded. Deceased had completed hooking and was in the process of descending from the car when she apparently lost her balance and fell to the ground, striking her head on the railroad track.

Employee used the brake wheel as a stepping point. She should have used the fixed ladder on the side of the railroad car.

Pinned Between Equipment

Employee was operating air-spinner tongs on Trip in Hole. Tongs swung around pinning employee between snub line and stand of drill pipe in rotary table.

Our investigation indicated that the employee incorrectly attached the snub line to the guide post which allowed the Varco spinning tongs to swing around as described above.

Action has been taken to remove the hazard of incorrect rigging of snub line by continuing regular safety meetings which included instructions on proper and safe operation of spinning tongs and snub line connections as well as other usual functions conducted on the rig floor.

CHEMICALS

Fire and Explosion

Six employees were fatally injured in a fire and explosion at a Polymer plant. The incident is still under investigation.

Fatal Burns

A seal failure occurred in a fractionator pump in the FCC Unit. Subsequent to the seal failure the pump bearing failed, destroying the Bearing Housing, which caused a major leak to develop. The employee, who was working in the operating unit, heard the seal failure and notified the other operators that he would switch pumps. The major leak of fractionation materials flashed, severely burning the employee who subsequently died approximately one week later.

Fatal Body Injuries

During the period of the refinery strike, the employee was working alone. He was operating a crane and somehow he got caught under the right rear wheel of the crane, incurring fatal injuries to abdominal area and legs.

Cause of the accident is unknown There were no witnesses.

Inhalation of Nitrogen

Employee was grinding in a cherry picker, using air mask. He hooked up a new oxygen bottle to the mask. The bottle was marked oxygen but unfortunately it contained nitrogen. The employee was found slumped over five minutes later.

As a preventative measure, all bottles should be checked before use. Also more careful observation must be made by the person on watch.

Electrocution

Employee accidentally came in contact with high voltage electric equipment in preparation for maintenance. He was killed instantly.

Electrocution can be prevented by employees following company procedures and insuring that the equipment is deenergized prior to maintenance.

Pulled into Machinery

Employee was attempting to clean a machine roll with a handy wipe towel while the Fiberline machine was running at full speed. The towel and his hand became entangled with the fiberline tow and he was pulled into the machinery. He died from multiple injuries.

The Fiberline machine should have been completely shut down before the cleaning operation began because op-

erating instructions recommended that machinery be shut down before such cleaning work is performed.

As a preventative measure, electrical sensors have been installed which will de-energize the equipment before an employee could enter the danger zone.

REFINING

Flash Fire

Two employees were burned when a flash fire occurred in the compression area of the FCC unit, resulting in death of both.

Reckless Driving

A group of employees were doing road maintenance work along the refinery grounds. While this maintenance work was being done, a semi-truck, traveling at a high rate of speed, crashed into the employees after ignoring a flagman and a sign truck with flashers and a rotating light on the cab roof. One employee was killed and two others were critically injuried.

Witnesses at the scene stated that at no time did the driver of the semi-truck apply his brakes or make any attempt to avoid the collision.

The incident is still under investigation.

Faulty Equipment

The gas-oil feed line to the coker unit ruptured and caused a fire, killing employee.

The unit was installed approximately fifteen years ago, and the contractor used a four foot section of pipe that did not meet the specifications.

Respiratory Failure

The employee succumbed while attempting to collect a BS&W sample through an open manhead of a tank which had been in toluene service. The product had been pumped out and the manhead removed preparatory to readying the tank for a different service.

Contrary to written tank entry procedures, the employee failed to wear respiratory protective equipment when he entered the storage tank.

Preventive measures is to stress tank entry procedures in all departments.

Heart Attack

The employee had been under undue stress due to having worked unusual schedule and performing unusual work for nine consecutive days preceding death. Employee had climbed several flights of stairs just prior to collapse. He had a heart attack and died.

MARKETING—WHOLESALE

Obstruction on Dark Highway

A Motor Fuel Transport, rounding a curve on a rural two lane highway, struck a black bull with the right front of the vehicle. After impact, vehicle came to rest partially in the roadway, ditch and adjacent field. Vehicle apparently exploded, burning driver and entire vehicle.

Car Accident

Vehicle #1 was traveling south on a straight road. The other vehicle, traveling north, cross over into the southbound lane and skidded into front of vehicle #1. Vehicle #1 veered to the right into a shallow ditch and burst into flames. Drivers of both vehicles burned in the wreckage.

Road and Weather Conditions

The vehicle in right lane skidded out of control on icy roadway into the path of a truck. Contact was made by right front wheel of truck with left front fender and wheel of other vehicle, causing driver to lose control. Truck struck right guard rail of overpass and skidded atop it for approximately 150 feet. At the end of the guard rail, the truck rolled over and slid down embankment killing driver.

Crushed to Death

The tank truck was sideswiped by an on-coming truck and trailer causing tank truck to go over an embankment. Employee was thrown from cab and, as truck rolled over, was crushed to death under drive wheels of truck.

Tank Truck Collision

Tank exploded on impact, killing employee when struck by another company's truck. The force of the explosion caused the death of another employee, who was standing beside our truck when it exploded.

Lost Control of Vehicle

Employee lost control of his tank truck and ran off a tollroad expressway, through a guard rail, and into a ditch. He sustained fatal injuries in the vehicle accident. The employee was alone in the vehicle at the time of the accident.

Exact cause not determined.

Asleep at Wheel

Employee was driving petroleum transport loaded with gasoline, when transport ran off right shoulder and down a fifteen foot embankment causing the vehicle to roll over several times. Driver was apparently ejected from driver's side to a position approximately sixty feet from final position of tractor. Driver was apparently killed instantly.

No mechanical defects were found in the initial investigation. Statements from witnesses and State Highway Patrol related that driver appeared to have fallen asleep.

These accidents can be prevented by stressing the importance of getting proper rest before reporting to work. Also, instruct drivers to park vehicle if sleepy and not continue to drive until able to do so in a safe manner.

MARKETING—RETAIL

Robbery

Store had converted to the use of exact cash. Employee was approached by suspect while walking from sales room to full service island. Employee had no company money on him. Robber took employee's wallet and rifled his pockets. There may have been a scuffle and employee was shot through the heart with a hand gun and was dead on arrival at the Medical Center.

PIPELINE—GAS

Collision

While driving on a two-landed good highway at about 50 mph in a one-ton welding truck with two passengers, the Company driver saw an approaching car angling into his lane. He tried to avoid a collision by veering left because there was a sharp embankment to the right. The oncoming driver then swung back toward his correct lane and the two vehicles then collided. The three employees were in the front seat of the Company vehicle. The driver and middle passenger were seriously injured and the employee seated next to the passenger side door was killed instantly.

Boating Accident

Employee was returning from an off-shore platform aboard a crew supply boat. The supply boat was struck by a freighter which cause the employee to be thrown overboard. The employee drowned.

Inclement weather and darkness were the cause of the accident.

All employees will be required to wear a life jacket or work vest while traveling aboard a Marine vessel to prevent mishaps in the future.

Massive Head Injuries

Employee killed while operating a valve, was attempting to operate it when head work assembly separated from valve body. This caused a sudden release of high pressure natural gas. Employee received massive head injuries which resulted in his death.

MARINE

Fatal Fall

The tanker vessel was in the yard for repair. A new 2½ inch neoprene jacketed fire hose was connected to the manifold and the ship's pipelines were being hydro tested at 150# to 225# pressure. There was air trapped in the piping system. The end of the hose pulled out of its coupling and the full stream of water hit a nearby employee in the chest. In his efforts to resist, he turned and the water struck him in the back. The force of the stream projected him over the side of the ship and he was fatally injured in the fall.

MISCELLANEOUS

Electrocuted

Employee was attempting to remove a high line (hot leg) from the old pole to the new pole when he came in contact with high voltage and was electrocuted.

Preventative measures:

1. De-energize all electrical equipment before any maintenance is performed.
2. A positive lockout and tag policy and procedure should be adhered to during maintenance and construction activities.

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50TH ANNUAL REVIEW OF FATAL INJURIES AS REPORTED BY THE PETROLEUM INDUSTRY TO THE AMERICAN PETROLEUM INSTITUTE FOR 1981

On-Duty Fatalities

One hundred and thirty four oil and gas companies and their subsidiaries, employing 507,000 workers, reported 52 on-duty fatal accidents during the year 1981. This is equivalent to one fatality for every 9,755 workers employed, compared with 6,751 in 1980.

Companies submitted detailed information on the causes of 43 of the fatal on-duty accidents. This information is reviewed herein. An increase occurred in the number of deaths where motor vehicles were involved, with 16 reported for 1981 compared with 14 in 1980.

Fatal on-duty accidents for 1981 are summarized, by functions and causes, and are compared with similar data for 1980 in Table I.

TABLE I

Fatalities by Functions and Causes, Years 1981 and 1980

	Cases Reported		Fire and Explosion		Struck by Equipment		Motor Vehicle		Aircraft		Other Causes	
	1981	1980	1981	1980	1981	1980	1981	1980	1981	1980	1981	1980
Total	43	49	10	11	4	4	16	14	1	4	12	16
Function:												
Exploration and Production	9	12	2	1	0	1	4	4	0	4	3	2
Gas Processing	1	1	0	0	1	0	0	0	0	0	0	1
Drilling	1	3	0	0	1	1	0	0	0	0	0	2
Chemicals	1	11	0	7	0	2	0	0	0	0	1	2
Refining	7	8	4	3	0	0	2	1	0	0	1	4
Marketing												
Wholesale	10	8	3	0	0	0	5	8	0	0	2	0
Retail	3	1	0	0	0	0	0	0	0	0	3	1
Pipeline												
Crude & Products	5	0	1	0	0	0	4	0	0	0	0	0
Gas	4	3	0	0	2	0	0	1	0	0	2	2
Marine	0	1	0	0	0	0	0	0	0	0	0	1
Research and Development	0	0	0	0	0	0	0	0	0	0	0	0
Engineering and General Services	1	0	0	0	0	0	1	0	0	0	0	0
Miscellaneous	1	1	0	0	0	0	0	0	1	0	0	1

EXPLORATION AND PRODUCTION

Leaking Gas Line

A leaking line allowed gas to accumulate inside a treater test building which ignited as the employee opened the door into the building. The employee received burns over 60 percent of his body. The source of ignition is unknown.

Drowning

Working on a well structure, the employee's "jo-boat" drifted away from the well sight. He tried to retrieve it, and drowned in the attempt.

Road and Weather Conditions

Driver was fatally burnt in a road accident when he collided with a truck which had stopped on the road in a heavy fog.

Car Accident

The driver of a company vehicle was returning from an oil lease at dusk. He was driving on a narrow dirt road. Company vehicle was headed north and another vehicle was headed south. The other vehicle hit the company's vehicle on the driver's side. Employee died approximately 11 hours after the accident.

The accident was caused when the two vehicles collided on a narrow dirt road at dusk.

Preventative measures for traveling on a narrow dirt road should be:

1. Go slowly.
2. Be cautious.
3. Keep as close as possible to the right side of the road.

Collision

Employee was driving south on a highway and a tractor-trailer truck swerved to the opposite lane of traffic and struck the employee's company vehicle head on. The employee was killed instantly.

Reckless driving on the part of the tractor-trailor driver was the cause of the accident. The accident could not have been prevented by company employee.

Vehicle Accident

A one-ton stake bed truck struck a bridge on a highway. The accident was determined to have been caused by the driver falling asleep at the wheel.

Explosion

The employee was attempting to relight a reboiler at a gasoline plant when an explosion occurred. The fire box cover blew off the unit and struck the employee.

The employee failed to follow standard reboiler lighting procedure which caused the accident. The employee was standing in front of fire tubes while lighting the reboiler, which was also contrary to established procedures.

Electrocuted

The employee received a fatal electrical shock, when attempting to determine the output of a transformer which utilized a 5,000 volt Simpson meter, with a hand held probe. After attaching the positive probe of the meter to the high voltage output terminal, inside the transformer box, he touched the negative probe to the ground and received a high voltage shock.

It should be noted that only qualified personnel should perform work or checkouts on high voltage transformers.

Fatal Electrical Shock

The employee was assisting in the off loading of equipment from a gang truck, when the gin poles on the truck came in contact with an overhead power line. The employee received a fatal electrical shock.

The company's rule requiring employees to maintain at least a 10 foot distance from all power lines was violated for no apparent reason.

GAS PROCESSING

Fatal Burns

Employee was critically burnt in flash fire which was ignited by a running backhoe. Victim was knocked into the backhoe by pressure which occurred when a cold cut, on a line that was supposed to be depressurized, broke loose.

DRILLING

Fatal Head Injury

Employee was attempting to unplug the drain over the rotary drive shaft. The water hose, with pipe nozzle attached, became wrapped around the Kelly Bushing which knocked the employee to the deck and then swung around again striking the employee on the head. Employee died of a skull fracture at the scene.

Such accidents can be prevented by keeping an area clean and by placing the hose on the outside of the Kelly Bushing area.

CHEMICALS

Electrocution

Driver was prepared to change the oil in a large end-dump truck. The operation required the raising of the truck bed. The deceased told the driver to drive the truck on to the earth location in order to allow the oil to drain on the ground. The driver did and raised the bed into a 33,000 volt electrical line. At the same time the truck bed hit the line, the deceased put his hand on the truck bed to insert a locking pin. An electric current passed through his body to the ground.

Cause of the accident was the improper positioning of the truck under the powerline to raise the truck bed. Also there was a lack of observation of the truck's position by the driver and the foreman.

Accidents like this can be prevented by designating a proper location, free of overhead lines and obstructions, to raise truck beds for maintenance and lubrication.

REFINING

Struck by Car

On a dark night, a chauffeur was assigned to pick up an employee at a local airport. While awaiting the arrival of his assigned passenger the employee stepped in front of another chauffeur's vehicle, which was pulling out of a designated area. He was hit and was fatally injured.

Litigation is pending.

Wrong Valve Opened

An employee opened the wrong valve when attempting to drain condensate from a coke drum on delayed coker unit. The employee died from fatal burns.

Recommendations for corrective action:

1. Change procedure for coke drum testing.

2. Provide radios for direct communication between those involved with coke drum testing.

3. No. 1 Operator should accompany the Assistant Operator to the Decoking Deck to insure the proper valve is opened to drain the condensate after pressure testing is complete and to assure the tag on the drain valve is removed.

4. Investigate modifications to drain valve piping (downstream) system which will reduce the possibility of condensate flashing.

Fire

Two employees received burns from a fire which occurred while installing blinds in preparation for a routine maintenance turnaround on a sulfur recovery unit. One employee, whose burns affected 90 percent of his body, died four months later. The other employee, with only slight burns on his legs, returned to work after a brief period of convalescence.

Recommendations for corrective action are as follows:

1. Written procedures for installing blanks (blinds) should be initiated to include a clear method of identifying flanges which are to be blanked.

2. Maintenance and operations should review job line-up procedures.

3. Continuous monitoring of potentially hazardous jobs should be done by supervision.

4. Investigate the use of different types of quick disconnect air line couplings.

Ignited Vapors

Gasoline was being pumped from storage tanks to a terminal storage tank for loading rack dispensing. The terminal storage tank overflowed, spilling gasoline on the ground and emitting vapor into the air. The deceased was apparently running to the storage tank to attempt to shut off the valve when a fire, of an unknown cause, ignited the vapors.

The accident resulted from a tank overfill as the tank did not have a high level alarm or automatic shut-off valves. A definite lack of communication between the pumper gauger and the employees pumping the product resulted in too many barrels of product being sent to terminal storage. Proper communication between employees transferring products from one tank to another is a must to prevent a recurrence.

Faulty Equipment

A 55,000 bbl. gasoline tank overflowed because an automatic tank gauge gave a false reading of 3½ feet. The product vapors ignited from a pickup truck driven by an employee.

To avoid repetition of this type of accident, tank sight gauge and hand line measurements must be used after automatic gauges indicate that the tank is 5 feet from being full. Moreover, guages are to be calibrated every month.

Respiratory Failure

The employee entered a reactor vessel, which was under a nitrogen purge, without respiratory protection for an inspection. The employee was asphyxiated.

Employee did not follow the appropriate safety procedure. He also failed to obtain permission from the unit operator prior to entering the vessel.

Struck by Truck

The employee parked his truck at the top of a small incline on an access road and he left the vehicle. He started to walk downhill. A fellow worker saw the truck rolling and shouted at the employee to get out of the way. He turned around, saw the truck rolling towards him and stretched out his arms to ward off the truck. The truck struck the employee, ran over him and killed him.

The front wheels should have been turned in toward the bank. Wheel chocks should have been used and the transmission should have been in park (it was in neutral).

MARKETING—WHOLESALE

Heart Attack

The employee was draining a product line and was using a transfer pump to pump the product into a pipeline going back to a tank. When the line was empty, he hurried about 200 feet to a valve to shut it off so that the pump would not be running dry for too long. When he reached the valve he became sick, closed the valve and called for help. He suffered a heart attack and died.

Motor Vehicle Accident

An experienced driver was killed when the truck he was driving suddenly rolled over.

A thorough investigation was made but the cause of the accident is unknown.

Explosion and Fire Kills Two

Two employees were repairing a bottom loading arm with small tools. The tank-truck was near the work area. When filling the loading arm with gasoline, ignition from an undetermined source occurred. An explosion and a fire resulted in one employee being killed instantly and the other, with burns affecting 80 percent of his body, dying three days later.

The tank truck should not have been in the area where the maintenance work was being done. Safeguards should be used at all times. An investigation is being made to determine what these should be.

Fatal Burns

A transport truck loaded with gasoline overturned and burnt. The driver was taken to the nearest burn center in a critical condition and later died. There were no other vehicles involved in the accident, nor were there any witnesses.

Fatally Injured

A gasoline transport driver was fatally injured when his truck went off the roadway and struck a tree and a concrete post.

There was no equipment malfunction or other vehicle involved. The exact cause of the accident was not determined.

Collision

Driver #1, who was just beginning his shift, was traveling NW on the highway. Driver #2, who was returning to the shop after a ten hour run, was traveling SE on the same highway. Driver #2 crossed a double yellow strip and collided with the left front bumper of the truck of Driver #1. Driver #1 was killed in the pre-dawn collision and Driver #2 was severely hurt.

Driver #2 was charged with criminal negligence-homicide.

Accidents like this can be prevented by the driver exercising good driving ability, with emphasis placed on proper rest when driving at night, and especially after a long shift.

Unloading Condensate

The driver had connected the unloading hose from the truck to a tank in order to unload condensate. The tank began to run over while he was still unloading. Condensate spilled on to the tank catwalk and the unloading truck. The driver ran to the truck and attempted to stop the engine. The area became engulfed with fire. The driver was unable to escape and was engulfed in the fire. He died instantly.

The distance between the tank and the truck was inadequate. The driver failed to determine the initial level of the liquid in the tank before unloading and to unload at a minimum distance of 25 feet from the tank.

Fatal Head Injury

Repairs were needed to be done on equipment in a service station bay. To reach this equipment, an eight foot ladder was used. The employee, standing on the middle section of the ladder, over-extended himself causing the ladder to topple. He landed on his head on the bay's concrete floor.

The cause of the accident was over reaching on a ladder.

Safety procedures should be reviewed with service men, stressing the proper use of ladders. Also more emphasis should be placed on safety awareness.

Exercise Care in Driving

The employee was on a routine work assignment when the company vehicle he was driving was struck broadside at the intersection. The employee was dead at the scene of the accident.

The other vehicle which ran a red light caused the accident. Drivers should be more observant while entering or passing through an intersection.

MARKETING—RETAIL

Shot in Robbery

There was a robbery at a service station. Employee was shot in the chest and killed.

Fatally Wounded

An employee, working alone in a convenience store at 2 a.m., was fatally stabbed during a robbery. There were no witnesses to the act. Police apprehended the suspect with the cash register a short distance from the store.

Preventative measures can be used such as:

1. Developing a method of operating stores with more security for employees.
2. Having more than one employee on duty.
3. Installing video monitors.

Armed Robbery

Employee was shot to death in an armed robbery at the service station at night.

PIPELINE—CRUDE AND PRODUCTS

Tractor Trailer Accident

The employee was driving a tractor-trailer rig and failed to negotiate a curve. The rig rolled into a ditch and the driver was thrown from the vehicle.

Failure to negotiate a curve in roadway was the cause of the accident.

Collision

A transport driver was killed after coming down an extremely long hill and was unable to stop at the scene of a previous accident. The transport truck struck an ambulance at the scene causing it to catch fire and explode; setting two pickups on fire. Although there were other minor injuries to persons in the area, there were no other fatalities.

The transport was not able to stop in time to avoid the collision. The accident is still under investigation.

Reckless Driving

A company employee, who was driving a pickup, entered a wide-open intersection at the same time another company's oil transport truck did. There was a collision. The employee was trapped inside the pickup cab.

Two vehicles entering an intersection, not maintaining a safe speed through the intersection, nor taking evasive action, were the cause of the accident.

Automobile Accident

An employee died approximately two weeks after he sustained injuries in an automobile accident.

The accident details are unknown.

Fire and Explosion

There was a valve failure in the line which allowed vapor to be released. Ignition from an unknown source caused a fire and an explosion which killed an employee.

PIPELINE—GAS

Asphyxiation

The employee had been attempting to clear a four inch drain line which ran from the basement of the engine room to a sump pit which was approximately twenty feet deep and fifty feet from the engine room. The employee had tried to clear the drain line by using a cable to rod the line from both the basement and the sump pit drains. As the rodding attempts were only partially successful in clearing the drain line, the employee broke into a closed water treatment system and got approximately five gallons of sulfuric acid which he poured into the basement drain. About two hours later he climbed down into the lower level of the sump pit and was overcome by toxic gases.

A co-worker entered the sump pit in an attempt to rescue the employee. In the rescue attempt, the co-worker was also overcome by the toxic gases.

The cause of the accident was probably a combination of carbon monoxide intoxication with oxygen deprivation by the replacement of atmospheric oxygen by foreign gases due to sulfuric acid being used to clear the drain.

The accident could have been prevented by:

1. Not having an authorized use of acid.
2. Having an emergency rescue procedure for this type of situation.

Ruptured Turbine Starter

The employee was in the process of starting the compressor when the valve to the starting gas was opened. The turbine starter ruptured and fatally injured the employee.

The accident was caused by the rotor overspeed due to a faulty design of the turbine starter. The starter manufacturer has subsequently changed the starter's design.

Slipped Boom Brake

The company was installing a new section of pipe on a steep hill and two welders were welding the new section into the line A boom brake slipped and the employee was struck on the head by the boom.

ENGINEERING AND GENERAL SERVICE

Automobile Collision

The employee was returning to the warehouse from tallying pipe in the field storage area. A car skidded on a bridge crashing head-on into the employee's car. The employee died instantly.

The employee was not at fault. The accident was caused by the mechanical failure of the other car.

MISCELLANEOUS

Airplane Crash

A chartered aircraft in which the employee was a passenger crashed on landing.

There was no cause determined.

1-2300—9/81—7C